

but where they might have been left by stranded icebergs, favors this conclusion.

5. The fact that a large part of the fragments detached from glaciers are of small size, and that these small fragments of icebergs or glaciers are dissolved and broken to pieces, at no great distance from the parent glacier, together with the fact that fragments of rock, although often seen near the source, are rarely seen at a distance, lead to the inference, that the same causes limited the transportation of the bowlders and larger fragments of the drift, to within the comparatively small distance from the parent rocks at which they now occur.

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ART. XXXVIII.—DESCRIPTIONS OF LAND SHELLS FROM THE PROVINCE OF TAVOY, IN BRITISH BURMAH. By AUGUSTUS A. GOULD, M. D. Read September 6, 1843.

IN correspondence with the Rev. Francis Mason, missionary of the Baptist Board for Foreign Missions at Tavoy, one of the provinces of British Burmah, I expressed a wish that he would send me some of the shells he might meet with in his journeyings. He very promptly interested some of the natives in the undertaking, and, by their assistance, soon forwarded me a collection, which I propose to notice in the present paper.

The province of Tavoy is situated between  $13^{\circ}$  and  $14^{\circ} 30'$  north latitude, and between the Bay of Bengal on the west, and the kingdom of Siam on the east. It is traversed by a range of mountains, from 500 to 1500 feet high, and is well watered by large rivers. As it is out of the track of commercial enterprise, it has been little explored by Europeans.

The collection contained thirty-five species, out of which I have, as yet, been able to identify only four or five as described

species. This is a very extraordinary proportion of new shells to be obtained from any part of the world, at the present day. In the present paper, I propose to confine myself to some of the land shells which I regard as new; reserving the fresh water species for another occasion.

#### HELIX PROCUMBENS.

Plate XXIV. Fig 1.

Testâ discoideâ, supra planulatâ, subtus convexâ, epidermide pallidè corneâ, latè umbilicatâ; anfr. quatuor, ultimo deflecto; aperturâ rotundatâ, labro reflexo, albo.

#### DESCRIPTION.

Shell depressed, discoidal, flat above, passing off below, from the periphery, by a convex slope, to the rounded verge of a broad, profound umbilicus, which distinctly exhibits all the whorls within; whorls four, the outer one deflected, so that the commencement of the lip is more than half way down towards the umbilicus; aperture rounded, rather wider than high; lip white, reflected, not flattened, the two extremities nearly continuous; surface slightly wrinkled, covered with a pale yellowish horn-colored epidermis.

Diameter  $\frac{3}{4}$  of an inch; height  $\frac{1}{4}$  of an inch.

Belongs to the group of which *H. planulata* is the type.

#### HELIX INFRENDENS.

Plate XXIV. Fig 6.

T. orbiculatâ, depresso-conoideâ, corneo-virescente, subcarinatâ, supra rugosè striatâ, infra glabrâ, nitidâ, regione umbilicali indentatâ; anfr. 7 convexis, suturâ impressâ; aperturâ coarctatâ, labro vix reflexo, dentibus tribus pliciformibus instructâ.

#### DESCRIPTION.

Shell small, orbicular, depressed-conical, of a greenish horn color; spire slightly elevated, composed of about seven convex, compact whorls, elegantly marked above by prominent, equal, and equidistant radiating striæ, which gradually disappear, till, beneath, it is quite smooth and shining; the periphery is slightly carinated; the under side is convex, but sinks, at the umbilical region, into a deep pit. The aperture

was apparently intended to be lunate; but, in consequence of an inflection of the lip, beginning at about one third the distance from the carina, it is rendered almost linear, and is still farther contracted by three oblique, pliciform teeth, on the inflected portion; lip white, very slightly reflected.

Diameter  $\frac{2}{5}$  of an inch; height  $\frac{1}{5}$  of an inch.

Very closely allied to *H. Rangiana*, Fer.

#### HELIX (CARACOLLA) GABATA.

Plate XXIV. Fig. 9.

Testâ albido-corneâ, supra planulata, infra valdè convexâ, latè et profundè umbilicatâ; anfr.  $4\frac{1}{2}$ , leviter striatis, ultimo carinâ castaneâ circumdato; aperturâ subquadratâ, labro albo, reflexo.

#### DESCRIPTION.

Shell pale horn-color, shining, showing about four and a half whorls above, which compose a nearly discoidal spire; suture distinct; the last whorl somewhat channelled near the periphery, which consists of a prominent, obtuse, compressed, chestnut-colored carina, fully developed to the lip; beneath, greatly convex, descending suddenly into a broad, deep, tunnel-shaped umbilicus, passing nearly through the shell; surface faintly marked by the striæ of growth; aperture rendered somewhat quadrangular by the junction of the lips and the two angles at the keel, and the ridge at the umbilicus; lip white, reflected, commencing below the keel, then rising to a level with it.

Diameter  $\frac{4}{5}$  of an inch; height less than  $\frac{2}{5}$  of an inch.

Much like *H. scabriuscula* in form and aperture, but quite different as to surface, color, and umbilicus.

#### HELIX (CARACOLLA) ANCEPS.

Plate XXIV. Fig 4.

Testâ lenticulari, pallidè corneâ, acutè carinatâ, supra striatâ, subtus nitidâ, vix perforatâ; anfr. 6, suprâ planulatis, suturâ submarginatâ; aperturâ lunulari, labro simplici, angulatâ.

#### DESCRIPTION.

Shell depressed-conical above, somewhat more convex beneath, compressed, of a pale horn color, rather fragile;

whorls six, flattened above, and separated by an indistinct, margined suture; periphery prominently and acutely carinate, above regularly and closely costate-striate; beneath convex, with very minute striæ of growth, smooth and shining; centrally-excavated, and with an almost imperceptible umbilicus; aperture commencing a little below the carina, lunate, with a sinus or angle where the keel terminates; lip simple, sharp.

Diameter  $\frac{7}{10}$  of an inch; height less than  $\frac{2}{5}$  of an inch.

In general form, color, and sculpture, it resembles *H. acies*, Fer., (*acutimargo* Rosm.) but is much smaller, and not widely umbilicated.

#### HELIX (CARACOLLA) RETRORSA.

Plate XXIV. Fig 5.

Testâ orbiculatâ, sinistrorsâ, utrinque convexâ, pallidè castaneâ, arcetè umbilicatâ; anfr. 5, lineis longitudinalibus et volventibus minutè rugosis, ultimo carinato; aperturâ rotundatâ, labro acuto.

#### DESCRIPTION.

Shell large, sinistral, orbicular, about equally convex above and below, but most rounded below; of a pale chestnut or fawn-color above, growing paler to the umbilicus, where it is pale horn-color. Surface somewhat undulated by the irregular lines of growth, and rendered minutely rugose by very fine, serpentine, revolving lines, forming conspicuous wrinkles near the carina; whorls five, forming a regular, moderately elevated spire, the suture slightly impressed, the periphery surrounded by a prominent, compressed, but acute keel, which becomes lost towards the aperture; aperture rounded, height and width about equal; lip simple, slightly everted in the umbilical region; some vitreous matter across the penultimate whorl; umbilicus rather large, but not deep.

Diameter  $1\frac{3}{4}$  inches; height 1 inch.

This large heterostrophe *Helix* resembles an inverted specimen of one of that group of shells, so common and so varied, from the Philippine Islands, of which *H. Lamarckii* is one. Young specimens might, at first glance, be confounded with *H. Himalana*, Lea; but the *Himalana* is much more globular, the surface less striated, the carina quite indistinct, and the umbilicus smaller.

## VITRINA PRÆSTANS.

Plate XXIV. Fig 2.

Testâ depressâ, fragili, nitidâ, stramineâ; anfr. tribus, striis incrementi et striis volventibus reticulatis; aperturâ sub-coarctatâ.

## DESCRIPTION.

This shell has the usual ear-shaped form of other species of the genus. It is principally remarkable for its great size, being, perhaps, the largest species known. There are about three whorls, not rising into a spire, distinguished by a delicate suture, which has an adjacent impressed line. The surface is delicately marked by the lines of growth, and these are crossed by shallow, somewhat scattered, revolving furrows. The aperture is nearly circular, rather wider than high; the lip is very delicate, generally inflected near its posterior junction, and the final additions to the shell are such as to cause the outlet to be somewhat contracted, or pursed in. The color is dark straw-color, or amber-color, inclining to green. A thin layer of enamel unites the two extremities of the lip.

Greatest length  $\frac{4}{5}$  of an inch; height  $\frac{2}{5}$  of an inch.

## HELIX (STREPTAXIS) PETITII.

Plate XXIV. Fig 3.

Testâ obliquè ovato-subglobosâ, albido-virescente, arcetè umbilicatâ; spirâ anfr. 7, convexusculis, apice obtusâ, supra striatâ, subtus lævigatâ; aperturâ subquadrata, anticè rotundatâ; columellâ dente lamelloso instructâ; peristomate albo, undulato, reflexo, ad angulum posticum attenuato.

## DESCRIPTION.

Shell obliquely ovate-globose, of a greenish white color, having a moderate, regular umbilicus; spire obtuse, of seven whorls, which, on the superior aspect, exhibit distinct and regular lines of growth; beneath. polished about the umbilicus; aperture semi-elliptical, rather large, having a single compressed tooth on the transverse portion, nearest to, and partially joining, the external lip; lip white, reflexed, and recurved, the external portion salient near the middle, and rapidly narrowed posteriorly.

Length  $\frac{2}{5}$  of an inch; breadth less than  $\frac{3}{10}$  of an inch.

In size and exterior, it closely resembles *S. aberrata*, Souleyet, but is rather larger. The aperture of the latter is, however, smaller, and ringent with teeth, besides having three folds near its channelled umbilicus. Its aperture is more nearly like *S. Souleyetiana* Petit; but the latter is described as having its umbilicus extending into a canal, and its peristome sub-continuous.

I dedicate it to M. Petit de la Saussaye, one of the most accomplished conchologists of the present day, who has added several species to this subgenus, and to whom I am under many obligations.

#### BULIMUS ATRICALLOSUS.

Plate XXIV. Fig. 3.

Testâ solidâ, imperforatâ, oblongo-ovatâ, vix striatâ, sulphureâ; anfr. 7 convexiusculis, ad suturam constrictis; aperturâ lunato-ovali, basi sub-effusâ, labro albo, reflexo, marginibus callo atro junctis.

#### DESCRIPTION.

Shell imperforate, elongated ovate, solid, smooth, and shining, of a sulphur-yellow color; whorls seven, moderately convex, somewhat girt in near the suture; last whorl nearly two thirds the length of the shell; aperture ovate-lunate, somewhat angular at base, and slightly effuse; lip white, widely revolute, not flattened; columella white, the callus uniting the extremities of the peristome, and, as far within the shell as can be seen, pitchy-black; from the midst of it, extending across the penult whorl, is a line of the same color, showing the termination of a former stage of growth.

Length  $2\frac{1}{2}$  inches; breadth 1 inch.

Two specimens of this shell were received. They are of the same type as some of the shells from the Philippine Islands, as *vittatus*, *Dryas*, and *maculiferus*. The black or molasses-colored callus seems to be constant, and distributed as in *B. iostoma*; though I have a shell, probably from Singapore, which is somewhat shorter, more ventricose, and with one whorl less, and the entire aperture white.

## CLAUSILIA INSIGNIS.

Plate XXIV. Fig. 8.

Testâ fusiformi, sinistrorsâ, solidâ, castaneâ; anfr. 9 convexis, leviter striatis; aperturâ purpureâ, rotundatâ, lamellis duabus fortibus posticè, et quinque tenuibus, per testam apparentibus, intus instructâ; labro valde reflexo.

## DESCRIPTION.

Shell reversed, solid, large, fusiform, ventricose, of a dark chestnut brown; whorls eight, convex, very delicately and regularly striated, shining, summit mamillated; aperture ovate, broadly rounded in front, with a sinus behind, produced by one of the two large folds which are there found; on breaking away half a volution, we find five other very delicate lamina, which may be seen externally, by looking at the umbilical aspect of the shell; the posterior one is near the suture, and extends nearly a whole volution; the others intervene, at nearly regular intervals, between it and the umbilicus; throat purplish; lip very broad, flattened, white, tinted with purple.

Length 1 inch; breadth  $\frac{1}{5}$  of an inch.

Resembles, in shape, color, and the arrangement of the external lamina, *C. Maccarana*; but it is larger and more ponderous than any other species with which I am acquainted.

## CYCLOSTOMA PERNOBILIS.

Plate XXIV. Fig. 11.

Testâ depresso-conicâ, apice acutâ, latè umbilicatâ; anfr. 6 subdepressis, striis incrementi conspicuis et striis volventibus rugulosis, ultimo carinâ costali albidâ cincto; aperturâ magnâ, intus cærulescente, labro crasso, expanso, vividè sanguineo: supernè coloribus piceis et lutescentibus variè nubeculatâ; infra albidâ, lineis piceis volventibus interruptâ.

## DESCRIPTION.

Shell depressed-conical, apex acute, solid; whorls six, rapidly increasing, and rising into a pyramidal spire, depressed near the suture. In the early stages, the whorls are acutely carinated; but, at maturity, the last whorl is rounded, and girt with an obtuse, whitish rib; the surface is rendered somewhat rugose, by rather conspicuous lines of growth, and coarse revolving lines, which, as they cross the finer longitudinal lines, seem to run in zigzag. Prevailing color above is dusky

brown, clouded by yellowish spots of various sizes, which, on the posterior whorls, are arranged in radiating zigzag series; a broad space around the umbilicus, which is very large and deep, is light straw color, with occasional revolving black lines or bands; aperture ample, somewhat wider than high, bluish within; peristome moderately reflected, rounded, of a beautiful carmine, or bright cherry-red color; not continuous, but embracing less than one fourth the preceding whorl, across which space passes a callus of the same red color.

Diameter 2 inches; height 1 inch.

This superb species is a little larger than any one hitherto described. The *C. involvulus*, Sowb., is a miniature of it. I received six specimens, young and old, all of the same magnitude. I received with them a multitude belonging to other smaller species; but they were so variable in appearance, that I do not yet venture to pronounce them new species.

#### CYCLOSTOMA SECTILABRUM.

Plate XXIV. Fig. 10.

Testâ turritâ, spirâ acuminatâ, arcetè umbilicatâ, brunneâ; anfr. 8 sub-ventricosus, vix striatis, penultimo sub-gilbo; aperturâ sub-orbiculari, intus rubescente, peritremate duplici, incrassato, albo, propè angulum posticum canali parvo interruptâ.

#### DESCRIPTION.

Shell elongated, spire acutely terminated, of a light reddish-brown color; whorls about eight, convex, nearly smooth, and shining; the penultimate whorl, on a profile view, somewhat gibbous; last whorl not conforming to the axis of the preceding whorls, but thrust forward, so that the plane of the aperture advances beyond a parallel with the axis; aperture colored as without; lip white, everted moderately, having a slight fissure or canal across it posteriorly, at the outer angle of the aperture; posteriorly the lip is double, the inner portion continuous, the outer terminating as it touches the shell; umbilicus small; operculum thin, horny.

Length 1 inch; breadth  $\frac{1}{4}$  of an inch.

Closely resembles *C. altum*, Sowb., but has the fissure across the peritreme on the opposite side. *C. croceum*, Sowb., may be only a faded specimen of this shell.



A.A. J. del.

W.H. Tappan

- 1 *Helix procumbens* 2 *Vitrina praestans* 3 *Bulimus ater callosus*  
 4 " *anceps* 5 *Caracolla retrorsa* 6 *Helix intrepida*  
 7 *Streptaxis pectus* 8 *Clausilia insignis* 9 " *gabata*  
 10 *Cyclostoma seculabrum* 11 *Cyclostoma pernebulis*  
 12 *Siphonostoma perfecta* 13 *S. luctaria* 14 *Planorbis dentatus*